Tracking status

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sPHENIX general meeting

August 19, 2016

Tracking tuning status

Report on progress in optimizing tracking efficiency with the TPC from Carloz Perez Lara at tracking meeting August 12:

https://indico.bnl.gov/conferenceDisplay.py?confId=2325

The efficiency was increased to 95% by raising the chisq cut and lowering the number of required layers (slide 3).No loss of momentum resolution.

The efficiency was further increased to 98% by lowering the MAPS detector thresholds. This was accompanied by improved DCA resolution, but worsened momentum resolution (slide 4). Because the DCA improves, this is probably not due to noise hits. Needs further investigation.

We decided to incorporate the improvements leading to 95% efficiency (slide 3) in origin master, since there is no degradation of performance. The lowering of the MAPS thresholds will not be merged until the decrease in momentum resolution is fixed.

TPC status

Report from Tom Hemmick at today's tracking meeting:

https://indico.bnl.gov/conferenceDisplay.py?confId=2342

summarizing slides presented at TPC meeting yesterday:

https://indico.bnl.gov/conferenceDisplay.py?confId=2337

Highlights:

- First IBF measurement by sPHENIX (WIS)
- First signals from 55Fe source in Ne2K gas (BNL)
- More progress on tracking performance (SBU)
- First pass at institutional assignments for tracking review Tom)
  - See next slide

TPC institutional assignments (Tom)

- WIS:
  - Prior to module production era they will be engaged in the measurements of IBF to verify current and future design issues.
  - During production they will build modules of one of the three sizes.
- BNL:
  - BNL leads the electronics effort (but maybe needs additional support?)
  - Prior to module production era they will be engaged in design/measurements of pad plane segmentation to optimize detector performance.
  - During production, they will be working with SBU for module insertion into TPC.
- PNPI:
  - Prior to module production they will work on theoretical calculations of new IBF strategies working hand-in-hand with WIS efforts.
  - During production they will build modules of one of three sizes.
- Vanderbilt:
  - Prior to module production era they will be engaged in software & field cage.
  - During production era they will build modules of one of three sizes.
- SBU:
  - Prior to module production, they will be engaged in software and field cage.
  - During production they will be working on module insertion.

MAPS inner barrel status

Organizational meeting this afternoon (2:00 pm - 6:00 pm ET):

https://indico.bnl.gov/conferenceDisplay.py?confId=2341

- Form MAPS inner barrel group
- Prepare for MAPS C&S review in September
- Future plans

Event pileup simulations status

First report from Mike McCumber at the tracking meeting on August 12:

https://indico.bnl.gov/conferenceDisplay.py?confId=2325

Initially poor performance, found to be due to vertex confusion caused by the additional out of time events.

After forcing the vertex to that of the in-time event, found good tracking performance up to 100 kHz event rate. No tracking degradation apparent.

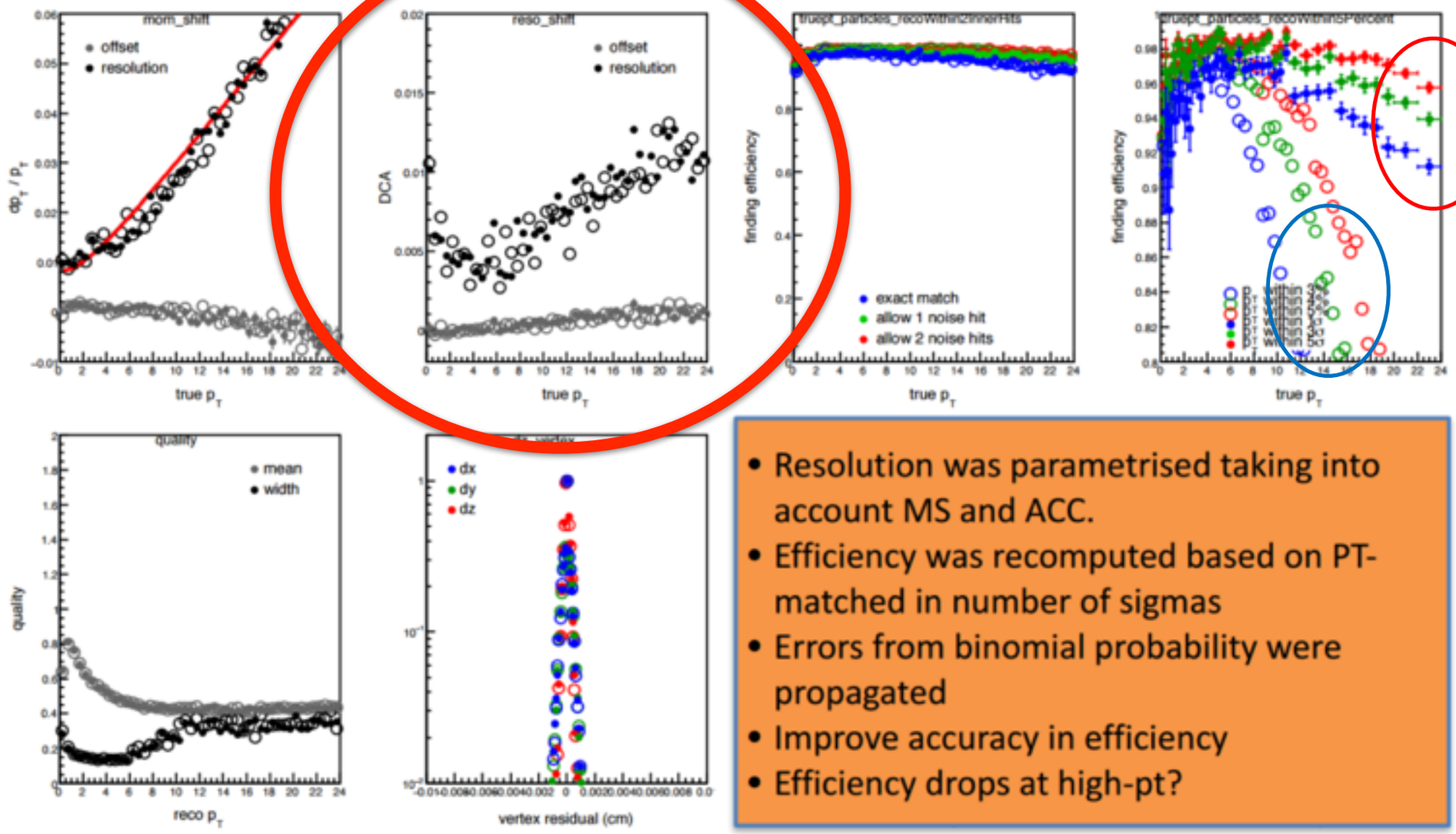
Mike has since increased to 200 kHz and still sees no degradation (!). He is trying to understand this now.

Intermediate tracker status

Itaru is planning to make a presentation at the tracking meeting next week (August 26) outlining the plan for intermediate tracker presentations at the tracking review.

Investigating a problem with DCA resolution

Resolution parametrisation and efficiency



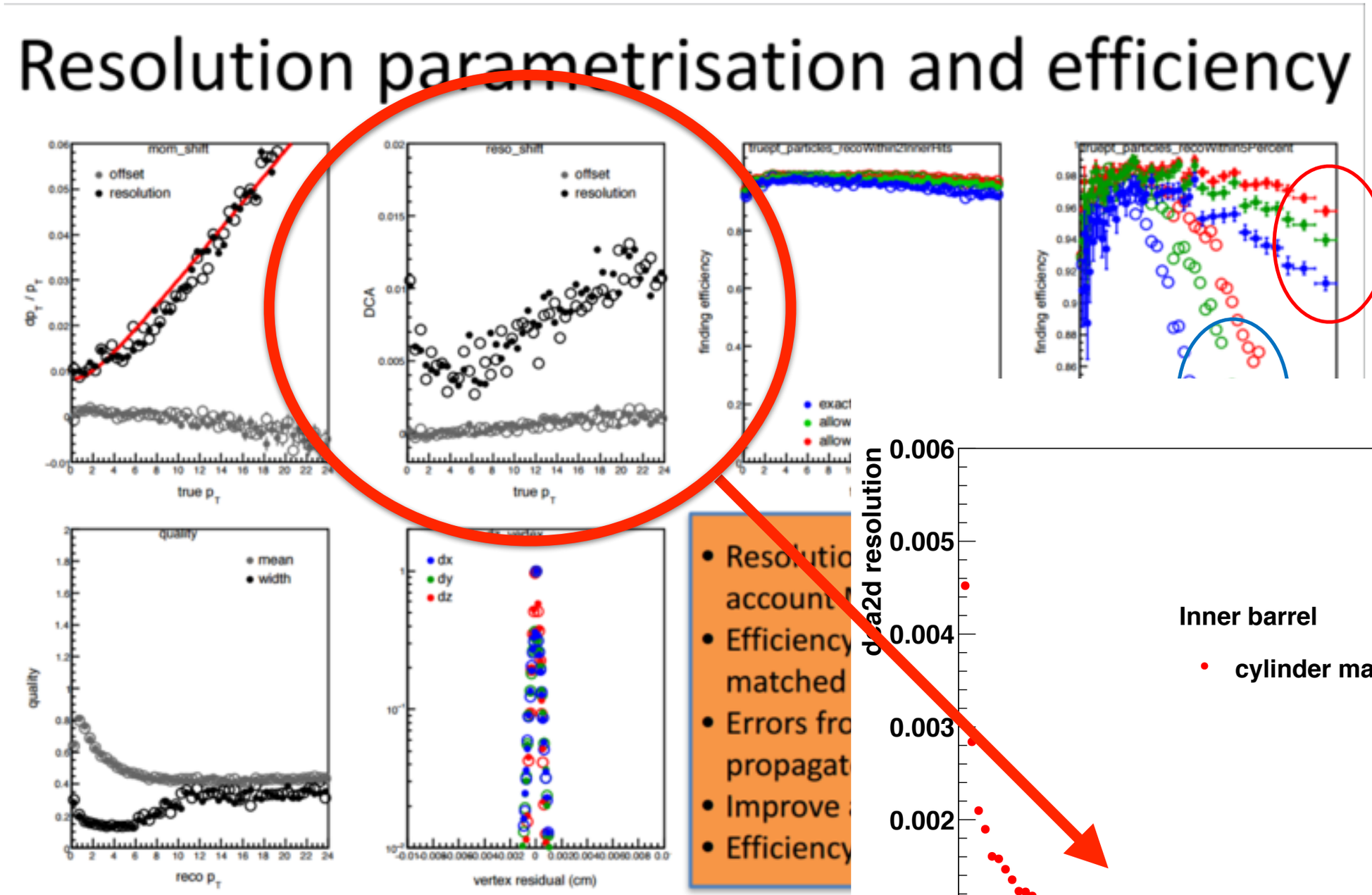
Fixed sigma

Fixed %

- Resolution was parametrised taking into account MS and ACC.
- Efficiency was recomputed based on PT-matched in number of sigmas
- Errors from binomial probability were propagated
- Improve accuracy in efficiency
- Efficiency drops at high-pt?

We have been seeing a problem with the dca2d resolution in TPC sims using Mike's standard test suite. Thought it was a tuning problem.

Investigating a problem with DCA resolution



Extracting it from evaluator output instead:

It looks like a problem with the algorithm that extracts DCA resolution, not the tracking - being looked at now.